REMARKS

This is intended as a full and complete response to the Office Action dated January 10, 2007 having a shortened statutory period for response set to expire on April 10, 2007. Claims 1 and 26 have been amended to more clearly recite various aspects of the invention. More specifically, "comparing the pressure-wave velocity to the shear-wave velocity to determine the shallow water flow risk" in claim 1 has been replaced with "computing a ratio between the pressure-wave velocity and the shear-wave velocity; and identifying shallow water flow risk areas based on the pressure-wave velocity to the shear-wave velocity ratio." Likewise, "determining the shallow water flow risk using the post-stack inverted elastic model to compare the pressure-wave velocity to the shear-wave velocity" in claim 26 has been replaced with "computing a ratio between the pressure-wave velocity and the shear-wave velocity based on the post-stack inverted elastic model to determine the shallow water flow risk".

New claim 28 has been added to more clearly recite aspects of the invention. Applicants believe no new matter has been introduced by the amendments and the new claim presented herein. The amendments have been made in a good faith effort to advance prosecution on the merits. Please reconsider the claims pending in the application for reasons discussed below.

In the Office Action, the Examiner states that "the Examiner agreed to withdraw the 102 rejections, including the de Kok reference because it was cumulative to the Mallick (1999)/Huffman rejections (and also because Applicants would amend around the Mallick/Huffman art)." The Examiner also states that he agreed during the interview to withdraw the objection to the oath.

The Examiner further states that the claims have not been amended. As a result, the Examiner reneges on the agreement he has made with Applicants during the interview. Applicants respectfully submit that an amendment was made to claim 1 in the previous response to office action dated June 7, 2006. More specifically, "determining the shallow water flow risk using the elastic model by comparing the pressure-wave velocity to the shear-wave velocity" has been replaced with "comparing the pressure-wave velocity to the shear-wave velocity to determine the shallow water flow risk".

Applicants respectfully request, therefore, that the Examiner honor the agreement he has previously made with Applicants during the interview.

The Examiner states that he has obtained Shallow Water Flow Prediction Using Prestack Waveform Inversion Of Conventional 3D Seismic Data And Rock Modeling by S. Mallick and N. Dutta (The Leading Edge July 2002) ("Dutta 2002"), which cites to The Petrophysical Basis For Shallow-Water Flow Prediction Using Multicomponent Seismic Data by A. Huffman and J. Castagna (The Leading Edge September 2001) ("H1"). The Examiner alleges that "this" should have been submitted in an IDS. It is unclear as to whether "this" refers to Dutta 2002 or H1. If "this" refers to Dutta 2002, then Applicants respectfully disagree. This article is not prior art to the present application since it is published after the filing date of the present application. If "this" refers to H1, then Applicants also respectfully disagree since Applicants believe H1 is not material to the claimed invention. Applicants respectfully request, therefore, that the Examiner's position regarding this article and its submission to IDS be withdrawn.

The Examiner also states that the IDS submitted by Applicants on May 10, 2006 includes a search report dated 2003. Applicants are at a lost as to the reason why the Examiner is bringing this up now.

Figure 6 is objected to for lacking a PRIOR ART legend in view of "Deepwater Geohazard Analysis Using Prestack Inversion" by de Kok et al., SEG September 2001 Expanded Abstracts ("de Kok"). Figures 7-8 are objected to for lacking a PRIOR ART legend in view of Prestack Waveform Inversion Using A Genetic Algorithm – The Present And The Future by S. Mallick, CSEG Recorder (June 2001) ("Mallick 2001"). Applicants respectfully traverse this objection.

As agreed upon by the Examiner during the interview, neither de Kok nor Mallick 2001 is a proper 102 reference. "For 35 U.S.C. 102(a) to apply, the reference must have a publication date earlier in time than the effective filing date of the application, and must not be applicant's own work." MPEP 706.02(a)(II)(C). In this case, de Kok is coauthored by both inventors of the present application. Mallick 2001 is authored by an inventor of the present application. Accordingly, both references are Applicants' own work. Applicants respectfully submit therefore that Figures 6-8 do not require the

PRIOR ART legend since they do not illustrate prior art. Withdrawal of the objection is respectfully requested.

Claims 1-5 and 7-27 stand rejected under 35 USC 102(a) as being anticipated by de Kok. Applicants respectfully traverse this rejection. MPEP 706.02(a)(II)(C) specifically states that for "35 U.S.C. 102(a) to apply, the reference must have a publication date earlier in time than the effective filing date of the application, and must not be applicant's own work." In this case, de Kok is coauthored by both inventors of the present application. As such, de Kok is Applicants' own work and is therefore not a proper 102 reference. Accordingly, claims 1-5 and 7-27 are patentable over de Kok. Withdrawal of the rejection is respectfully requested.

Claims 1-5 and 7-27 stand rejected under 35 USC 102(a) as being anticipated by The Petrophysical Basis For Shallow-Water Flow Prediction Using Multicomponent Seismic Data by A. Huffman and J. Castagna (The Leading Edge September 2001) ("H1"). The Examiner specifically refers to Figures 6-9 and column 2 of page 1033 to first paragraph, column 1 of page 1035 as the basis of his rejection. Applicants respectfully traverse this rejection.

Figure 6 of H1 illustrates pulse transmission measurements on brine-saturated sand packs. The text describing Figure 6 states that the "combination of these two predictions suggests that the V_P/V_S ratio of these sands may change dramatically under small load changes." See column 2, second paragraph on page 1033.

Figure 7 of H1 illustrates a compilation of water-saturated V_P and V_S measurements from the study conducted described in H1. See column 1, first paragraph on page 1034.

Figure 8 of H1 illustrates a plot of V_P/V_S ratio against effective pressure on a logarithmic scale.

Figure 9 of H1 illustrates a plot of V_P/V_S against effective stress for brine-saturated sand packs containing 8% clay by weight and power-law empirical fit.

H1 proposes that at "higher effective stresses, the rock frame is more rigid and the sediment behaves more like a solid. The region of rapid rigidity loss is a likely candidate for SWF. The loss of rigidity may also be tied back to the strength of the materials and their resistance to liquefaction and formation collapse. Poisson's ratio,

the modulus of rigidity, and shear-wave quality factor (Q or attenuation) should be highly anomalous for sands close to failure and prone to SWF." See column 2, second paragraph on page 1033.

Applicants have reviewed H1 in its entirety, including Figures 6-9 and column 2 of page 1033 to first paragraph, column 1 of page 1035 and have found nothing that anticipates the limitations of claims 1 and 26. For example, H1 does not teach or disclose applying a pre-stack waveform inversion on the seismic data at a selected control location to provide an elastic model, wherein the elastic model comprises pressure-wave velocity and shear-wave velocity; or identifying shallow water flow risk areas based on the pressure-wave velocity to the shear-wave velocity ratio, as recited in amended claim 1. H1 also does not teach or disclose computing a ratio between the pressure-wave velocity and the shear-wave velocity based on the post-stack inverted elastic model to determine the shallow water flow risk, as recited in amended claim 26. Accordingly, Applicants respectfully submit that claims 1 and 26 are patentable over H1. Claims 2-25 and 27 are also patentable over H1 since they depend from claims 1 and 26, respectively. Withdrawal of the rejection is respectfully requested.

Claims 1-5 and 7-27 stand rejected under 35 USC 102(e) as being anticipated by US Patent No. 6,694,261 ("H2"). More specifically, the Examiner refers to column 6, lines 6-20 and column 11, line 60 to column 12, line 49. However, the text provided by the Examiner appears to be from column 6, lines 6-54 and column 11, line 60 to column 12, line 49. For purposes of our analysis, Applicants have assumed that the Examiner made a typographical error and have given the Examiner the benefit of the doubt. Nevertheless, Applicants respectfully traverse this rejection.

Applicants appreciate the Examiner for providing the text the Examiner deems relevant to the claimed invention. In particular, the Examiner underlined the following portion of the text: "[t]he Vp/Vs ratio, on the other hand, increases from a value of about 2.5 at 1000 psi to over 6.0 at 20 psi. An effective stress of 1000 psi corresponds roughly to a subsea depth of approximately 2000 feet for normally pressured sediments. This is within the range where abnormally pressured SWF sands have been encountered in deepwater drilling. …These changes in the Q ratio correlate closely to the Vp/Vs ratio." Even after analyzing the text the Examiner deems most relevant to the claimed

invention, Applicants still respectfully submit that H2 does not specifically teach every limitation of claims 1 and 26. For example, no where in H2, including the passages to which the Examiner has referred, teaches or discloses identifying shallow water flow risk areas based on the pressure-wave velocity to the shear-wave velocity ratio, as recited in amended claim 1. Likewise, no where in H2, including the passages to which the Examiner has referred, teaches or discloses computing a ratio between the pressure-wave velocity and the shear-wave velocity based on the post-stack inverted elastic model to determine the shallow water flow risk, as recited in amended claim 26. Therefore, claims 1 and 26 are patentable over H2. Claims 2-25 and 27 are also patentable over H1 since they depend from claims 1 and 26, respectively. Withdrawal of the rejection is respectfully requested.

Claims 1-5 and 7-27 stand rejected under 35 USC 103(a) as being unpatentable over Some Practical Aspects Of Prestack Waveform Inversion Using A Genetic Algorithm: An Example From The East Texas Woodbine Gas Sand by S. Mallick, Geophysics, Vol. 64, No. 2, pages 326-336 (March-April 1999) ("Mallick 1999") in view of H2.

Mallick 1999 is generally directed to a prestack inversion technique using a genetic algorithm. However, Mallick 1999 does not teach or disclose identifying shallow water flow risk areas based on the pressure-wave velocity to the shear-wave velocity ratio, as recited in amended claim 1. Mallick 1999 also does not teach or disclose computing a ratio between the pressure-wave velocity and the shear-wave velocity based on the post-stack inverted elastic model to determine the shallow water flow risk, as recited in amended claim 26. In contrast, Mallick 1999 proposes comparing the post stack inversion with the prestack inversion to demonstrate the superiority of the prestack inversion. See page 331, column 1.

The Examiner takes the position that Poisson's ratio is well known. The Examiner is reminded that neither claim 1 nor claim 26 recites Poisson's ratio. Only claim 3 recites Poisson's ratio. Applicants respectfully submit therefore that the Examiner's comments regarding Poisson's ratio is misplaced.

Like Mallick 1999, H2 also does not teach or disclose identifying shallow water flow risk areas based on the pressure-wave velocity to the shear-wave velocity ratio, as

recited in amended claim 1; and computing a ratio between the pressure-wave velocity and the shear-wave velocity based on the post-stack inverted elastic model to determine the shallow water flow risk, as recited in amended claim 26.

Neither Mallick 1999 nor H2, alone or in combination, teaches or discloses identifying shallow water flow risk areas based on the pressure-wave velocity to the shear-wave velocity ratio, as recited in amended claim 1; and computing a ratio between the pressure-wave velocity and the shear-wave velocity based on the post-stack inverted elastic model to determine the shallow water flow risk, as recited in amended claim 26. Furthermore, there is no suggestion discerned in Mallick 1999 or H2 of modifying the devices or methods disclosed therein in the direction of claims 1 or 26, nor is there any suggestion of the desirability of such modifications. The absence of such a suggestion to combine the references is dispositive in an obviousness determination. *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573, 1579 (Fed. Cir. 1997). Therefore, claims 1 and 26 are patentable over Mallick 1999 in view of H2. Claims 2-25 and 27 are also patentable over Mallick 1999 in view of H2 since they depend from claims 1 and 26, respectively.

Claim 6 stands rejected under 35 USC 103(a) as being unpatentable over Mallick 1999 in view of H2 and Kirchhoff Imaging As A Tool For AVO/AVA Analysis by Tygel et al., The Leading Edge (August 1999) ("Tygel").

Neither Mallick 1999 nor H2 nor Tygel, alone or in combination, teaches or discloses identifying shallow water flow risk areas based on the pressure-wave velocity to the shear-wave velocity ratio, as recited in amended claim 1. Furthermore, there is no suggestion discerned in Mallick 1999, H2 or Tygel of modifying the devices or methods disclosed therein in the direction of claim 1, nor is there any suggestion of the desirability of such modifications. Since claim 6 depends from claim 1 and since neither Mallick 1999 nor H2 nor Tygel, alone or in combination, teaches, discloses or suggests all the limitations of claim 1, claim 6 is therefore also patentable over Mallick 1999, H2 and Tygel. Accordingly, withdrawal of the rejection is respectfully requested.

Claim 6 stands rejected under 35 USC 103(a) as being unpatentable over de Kok in view of Tygel. As mentioned above, MPEP 706.02(a)(II)(C) specifically states that for "35 U.S.C. 102(a) to apply, the reference must have a publication date earlier in time

than the effective filing date of the application, and must not be applicant's own work." In this case, de Kok is coauthored by both inventors of the present application. As such, de Kok is Applicants' own work and is therefore not a proper 102 reference. Further, Tygel fails to teach identifying shallow water flow risk areas based on the pressure-wave velocity to the shear-wave velocity ratio, as recited in amended claim 1. Accordingly, since claim 6 depends from claim 1 and claim 1 is patentable over Tygel, claim 6 is also patentable over Tygel. Withdrawal of the rejection is respectfully requested.

With regard to new claim 28, Applicants submit that claim 28 recites subject matter that is neither disclosed, taught, nor otherwise suggested by the cited references, and as such, allowance of the claim is respectfully requested.

In conclusion, the references cited by the Examiner, neither alone nor in combination, teach, show, or suggest the claimed invention. Having addressed all issues set out in the office action, Applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

The prior art made of record is noted. However, it is believed that the secondary references are no more pertinent to the Applicants' disclosure than the primary references cited in the office action. Therefore, it is believed that a detailed discussion of the secondary references is not deemed necessary for a full and complete response to this office action. Accordingly, allowance of the claims is respectfully requested.

Respectfully submitted,

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